

BASIC NOMENCLATURE

A STUDENT WHO HAS MASTERED THE MATERIAL IN THIS SECTION SHOULD BE ABLE TO:

1. Give the IUPAC names of open-chain alkanes, alkenes (including *cis* and *trans*), alkynes, alkyl halides, and alcohols having a longest chain of ten carbons or less when given the structure, and draw the structure given the name. The unbranched alkanes whose names are the basis of this are:

methane (1 carbon)
ethane (2 C's)
propane (3 C's)
butane (4 C's)
pentane (5 C's)

hexane (6 C's)
heptane (7 C's)
octane (8 C's)
nonane (9 C's)
decane (10 C's)

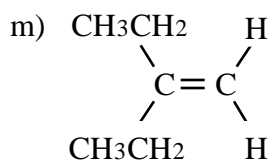
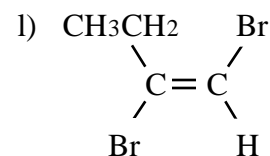
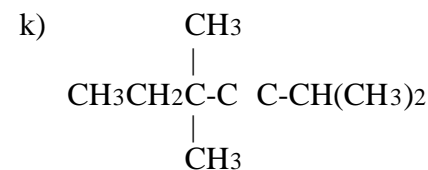
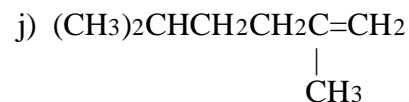
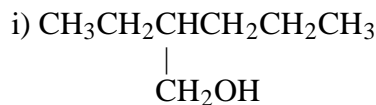
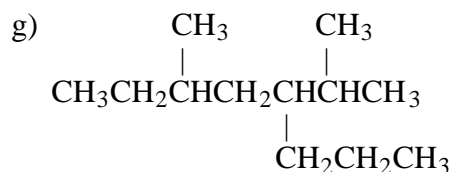
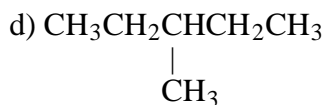
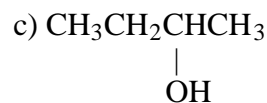
The names of the groups you must be able to recognize and draw are:

methyl, ethyl, propyl, butyl, pentyl, hexyl, heptyl, octyl, nonyl, decyl (the unbranched groups)
isopropyl
isobutyl, *sec*-butyl, *tert*-butyl
neopentyl
vinyl and allyl

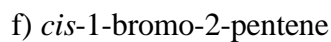
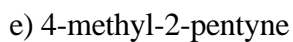
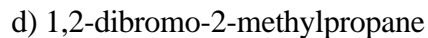
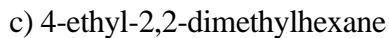
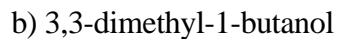
2. Give the IUPAC name when given the structure, and give the structure given the IUPAC name, of monocyclic alkanes, alkenes, alkynes, alcohols, and alkyl halides having rings containing 3-10 carbons. These compounds may also contain halogen atoms and side chains.
3. Give the IUPAC name when given the structure, and draw the structure given the name, of bicyclic alkanes. These alkanes may have alkyl groups or halogen atoms as substituents.
4. Give the common name when given the structure, and give the structure when given the common name, of simple alcohols and alkyl halides. In the system used here compounds are named by first naming the alkyl group and then naming the functional group (e. g. ethyl alcohol, neopentyl bromide).
5. Give the common name when given the structure, and draw the structure when given the common name, of unsubstituted monocyclic alcohols and alkyl halides (e. g. cyclobutyl alcohol).
6. Draw the structure when given any of the following common names: ethylene, propylene, isobutylene, acetylene, and alkylacetylenes including any of the alkyl groups named in #1 above. Also, give the name when given the structure of any of these compounds.

A STUDENT WHO HAS MASTERED THE OBJECTIVES ON THE PREVIOUS PAGE SHOULD BE ABLE TO SOLVE THE FOLLOWING PROBLEMS AND RELATED ONES:

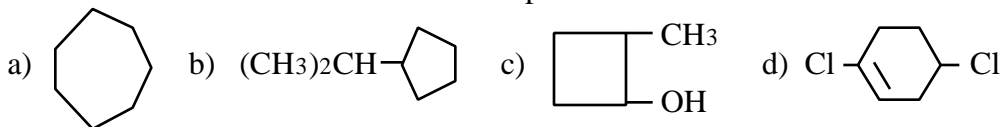
1.1 Give the IUPAC name of each of the compounds shown.



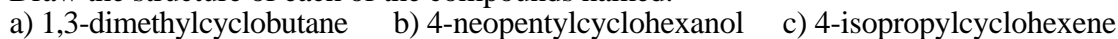
1.2 Draw the structure of each of the compounds named below.



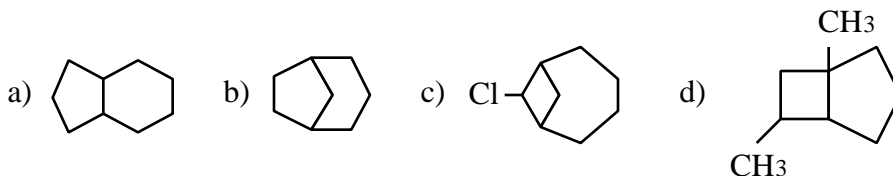
2.1 Give the IUPAC name of each of the compounds shown.



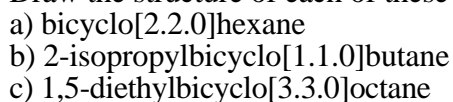
2.2 Draw the structure of each of the compounds named.



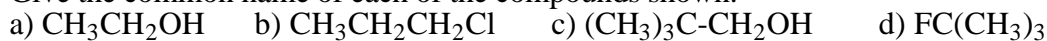
3.1 Give the name of each of the compounds shown.



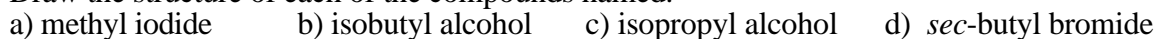
3.2 Draw the structure of each of these compounds.



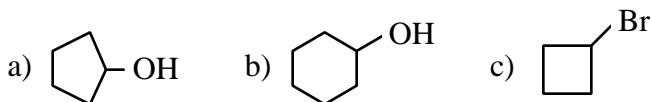
4.1 Give the common name of each of the compounds shown.



4.2 Draw the structure of each of the compounds named.



5.1 Give the common name of each of the following compounds.



5.2 Draw the structures of the following compounds.



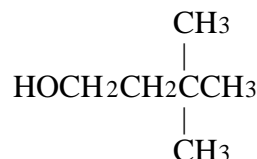
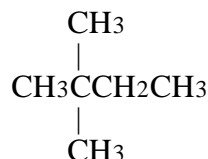
6. Draw the structures of each of the following compounds.



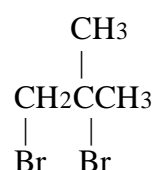
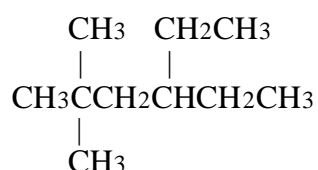
SOLUTIONS TO SAMPLE PROBLEMS:

- 1.1 a) pentane b) trichloromethane c) 2-butanol d) 3-methylpentane
 e) 3-bromo-2-methylpentane f) 3-ethylhexane g) 5-isopropyl-3-methyloctane
 h) 3,3-dibromo-1,1,1-trichlorobutane i) 2-ethyl-1-pentanol j) 2,5-dimethyl-1-hexene
 k) 2,5,5-trimethyl-3-heptyne l) *trans*-1,2-dibromo-1-butene m) 2-ethyl-1-butene

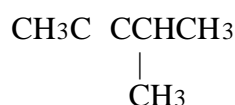
- 1.2 a) 2,2-dimethylbutane b) 3,3-dimethyl-1-butanol



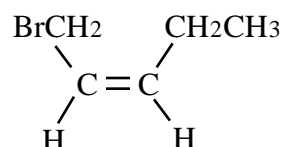
- c) 4-ethyl-2,2-dimethylhexane d) 1,2-dibromo-2-methylpropane



- e) 4-methyl-2-pentyne

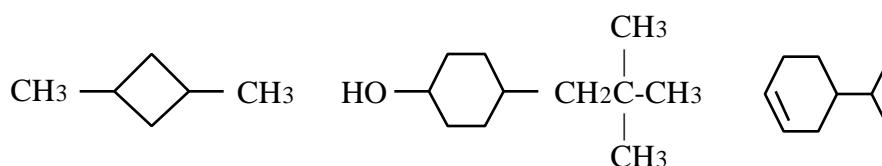


- f) *cis*-1-bromo-2-pentene



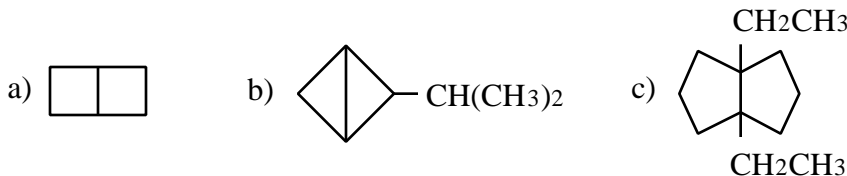
- 2.1 a) cycloheptane b) isopropylcyclopentane
 c) 2-methylcyclobutanol d) 1,4-dichlorocyclohexene

- 2.2 a) 1,3-dimethylcyclobutane b) 4-neopentylcyclohexanol c) 4-isopropylcyclohexene



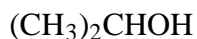
- 3.1 a) bicyclo[4.3.0]nonane b) bicyclo[3.2.1]octane
 c) 7-chlorobicyclo[4.1.1]octane d) 1,6-dimethylbicyclo[3.2.0]heptane

- 3.2 The structures are:



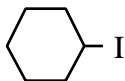
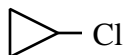
4.1 a) ethyl alcohol b) propyl chloride c) neopentyl alcohol d) *tert*-butyl fluoride

4.2 a) methyl iodide b) isobutyl alcohol c) isopropyl alcohol d) *sec*-butyl bromide

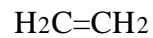
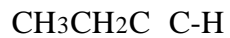


5.1 a) cyclopentyl alcohol b) cyclohexyl alcohol c) cyclobutyl bromide

5.2 a) cyclopropyl chloride b) cyclohexyl iodide



6. a) propylene b) acetylene c) ethylacetylene d) ethylene



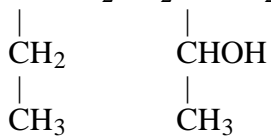
1) Name $\text{Cl}_3\text{CCH}_2\text{Cl}$

6) Draw neopentylcyclohexane

2) Name $(\text{CH}_3)_2\text{CH}(\text{CH}_2)_3\text{CH}(\text{CH}_3)_2$

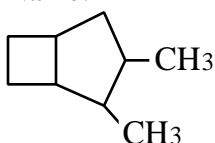
7) Draw 2,4-dibromo-3-ethylhexane

3) Name $\text{BrCHCH}_2\text{CH}_2\text{CHCH}_2\text{CH}_3$

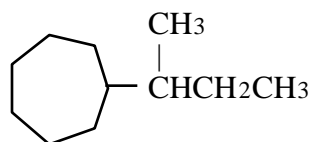


8) Draw 3,3-dimethylcyclobutanol

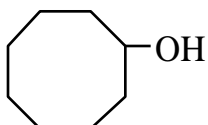
4) Name:



9) Name:

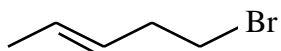


5) Name



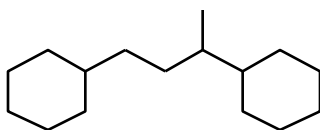
10) Draw cyclopentyl fluoride

11) Name



14) Give a structure for: propylacetylene

12) Name:



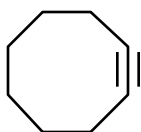
15) Give a structure for:

4-methyl-1-neopentylbicyclo[3.2.1]octane

13) Give a structure for: allyl alcohol

Name _____ Third Drill Test (Sample B)
Organic Chemistry 2210 DR Answer All Questions

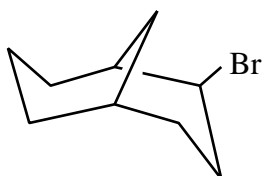
1) Name:



4) Give a structure for:

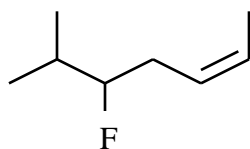
1,3-di-*tert*-butylcyclohexene

2) Name:



5) Give a structure for: vinyl chloride

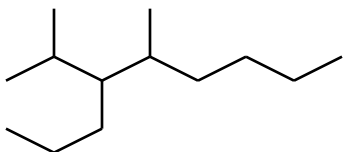
3) Name:



6) Name $\text{BrCH}_2\text{CH}_2\text{CHBr}_2$

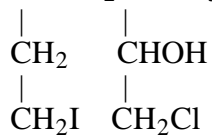
11) Give a structure for: 2,3-dimethylpentane

7) Name:



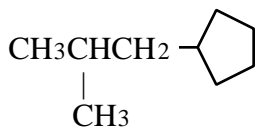
12) Give a structure for:
2,2-dimethylbicyclo[3.2.1]octane

8) Name: $\text{BrCHCH}_2\text{CHCH}_3$



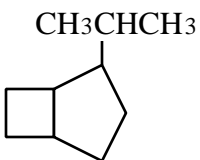
13) Give a structure for:
4-*tert*-butyl-4-ethylcyclohexanol

9) Name:



14) Give a structure for:
3,5-dichloro-4-iodononane

10) Name:



15) Give a structure for: *sec*-butyl alcohol